

CLAIMS:

1. An image forming apparatus which repeats image create/transfer processing, which is serial processing of forming a toner image on a photosensitive member while rotating said photosensitive member and a transfer medium in a sub scanning direction and thereafter transferring said toner image onto said transfer medium, for a plurality of toner colors which are different from each other, to thereby lay toner images in said respective toner colors over each other on said transfer medium and accordingly form a color image,

characterized in correcting transfer start positions of toner images in at least one or more toner colors out of said plurality of toner colors based on a registration control amount which is necessary to correct relative registration deviations among toner images on said transfer medium.

2. An image forming apparatus in accordance with Claim 1, comprising:

abutting means which temporarily contacts said transfer medium while said image create/transfer processing is repeated; and

control means which corrects transfer start positions of toner images, using as said registration control amount a control amount which is necessary to correct relative registration deviations among toner images on said transfer medium which are created as said abutting means contacts

and moves away from said transfer medium.

3. An image forming apparatus in accordance with Claim 2, wherein said control means executes registration control amount establish processing before a color image is formed, to thereby identify said registration control amount.

4. An image forming apparatus in accordance with Claim 3, wherein said registration control amount establish processing is to identify said registration control amount while allowing said abutting means to contact and move away from said transfer medium which is in rotation in a dedicated sequence which is different from a printing sequence which is for forming a color image.

5. An image forming apparatus in accordance with Claim 4, further comprising:

a drive source which generates rotational drive force; and

power transmission means which comprises a plurality of power transmission members which transmit the rotational drive force from said drive source to said photosensitive member and said transfer medium,

wherein said transfer medium is a transfer drum, and

at least one of said plurality of power transmission members is elastically deformed in accordance with a load change which is generated as said abutting means contacts and moves away from said transfer

medium, to thereby create said registration deviations.

6. An image forming apparatus in accordance with Claim 5, further comprising reference signal detecting means which outputs a reference signal in relation to rotation of said transfer medium,

wherein said registration control amount establish processing is to measure

(1) as a steady period, a period during which said abutting means remains separated away from said transfer medium or a period during which said abutting means remains contacting said transfer medium, and

(2) as a contact/separate period, a period during which said abutting means which used to be away from said transfer medium contacts said transfer medium or a period during which said abutting means which used to remain contacting said transfer medium moves away from said transfer medium,

and to identify said registration control amount based on the amount of a difference between said steady period and said contact/separate period.

7. An image forming apparatus in accordance with Claim 6, wherein said registration control amount establish processing is to identify said registration control amount based on said plurality of periods which are measured after said transfer medium rotates a predetermined number of times since started rotating.

8. An image forming apparatus in accordance with Claim 4, further comprising:

a drive source which generates rotational drive force; and

power transmission means which comprises a plurality of power transmission members which transmit the rotational drive force from said drive source to said photosensitive member and said transfer medium,

wherein said transfer medium is a transfer belt, and

at least one of said plurality of power transmission members or said transfer medium is elastically deformed in accordance with a load change which is generated as said abutting means contacts and moves away from said transfer medium, to thereby create said registration deviations.

9. An image forming apparatus in accordance with Claim 8, further comprising reference signal detecting means which outputs a reference signal in relation to rotation of said transfer medium,

wherein said registration control amount establish processing is to measure, based on said reference signal,

(a) a period during which said abutting means which used to be away from said transfer medium contacts said transfer medium,

(b) a period during which said abutting means remains contacting said transfer medium,

(c) a period during which said abutting means which used to remain contacting said transfer medium moves away from said transfer

medium, and

(d) a period during which said abutting means remains separated away from said transfer medium, and to identify said registration control amount based on the amount of a difference between these periods.

10. An image forming apparatus in accordance with Claim 9, wherein said registration control amount establish processing is to identify said registration control amount based on said plurality of periods which are measured after said transfer medium rotates a predetermined number of times since started rotating.

11. An image forming apparatus in accordance with Claim 3, wherein said control means executes said registration control amount establish processing after turning on of a power source of said apparatus but before the first color image is formed, and identifies said registration control amount.

12. An image forming apparatus in accordance with Claim 3, wherein said control means executes said registration control amount establish processing during warming up of said apparatus which is executed immediately after turning on of a power source of said apparatus.

13. An image forming apparatus in accordance with Claim 3,

further comprising fixing means which fixes a toner image,

wherein said control means executes said registration control amount establish processing when said fixing means reaches a predetermined temperature.

14. An image forming apparatus in accordance with Claim 3, wherein said control means executes said registration control amount establish processing after one color image is formed but before the next color image is formed.

15. An image forming apparatus in accordance with Claim 3, wherein said control means determines timing to execute said registration control amount establish processing based on an operation state of said apparatus.

16. An image forming apparatus in accordance with Claim 3, further comprising detecting means which detects at least one of a temperature and a humidity level inside said apparatus,

wherein said control means determines timing to execute said registration control amount establish processing based on a result of the detection by said detecting means.

17. An image forming apparatus in accordance with Claim 3, wherein said control means determines timing to execute said registration

control amount establish processing in accordance with a status of said apparatus.

18. An image forming apparatus in accordance with Claim 3, further comprising a cleaner blade for photosensitive member which always remains contacting said photosensitive member,

wherein said control means provides said cleaner blade for photosensitive member with toner prior to execution of said registration control amount establish processing.

19. An image forming apparatus in accordance with Claim 3, wherein said abutting means comprises at least a secondary transfer roller which transfers onto a sheet member a toner image which has been transferred to said transfer medium.

20. An image forming apparatus in accordance with Claim 19, wherein said control means provides said secondary transfer roller with a secondary transfer bias when executing said registration control amount establish processing.

21. An image forming apparatus in accordance with Claim 19, wherein said control means provides said secondary transfer roller with a bias which has the opposite polarity to that of said secondary transfer bias when executing said registration control amount establish processing.

22. An image forming apparatus in accordance with Claim 3, wherein said control means provides said transfer medium with a primary transfer bias when executing said registration control amount establish processing.

23. An image forming apparatus in accordance with Claim 1, comprising:

abutting means which temporarily contacts said transfer medium, in one sequence which corresponds to an operation state of said apparatus among a plurality of sequences which are different from each other, while said image create/transfer processing is repeated;

memory means which stores a plurality of registration control amounts which are necessary to correct relative registration deviations among toner images on said transfer medium which are created because of contact and separation from said transfer medium; and

control means which reads a registration control amount which corresponds to said one sequence from said memory means and corrects transfer start positions for toner images in said respective toner colors based on said registration control amount.

24. An image forming apparatus in accordance with Claim 23, wherein identification variables are provided one for each one of said plurality of sequences, and

said control means further comprises:

an identification variable setting part which sets up an identification variable which corresponds to said one sequence;

a registration control amount setting part which reads from said memory means and sets up a registration control amount which corresponds to an identification variable which is set up by said identification variable setting part; and

a correction control part which corrects transfer start positions for toner images in said respective toner colors based on said registration control amount which is set up by said registration control amount setting part.

25. An image forming apparatus in accordance with Claim 23, wherein identification variables are provided one for each one of said plurality of sequences, and said identification variables are stored in said memory means as they are correlated with registration control amounts which correspond to said respective identification variables, and

said control means further comprises:

an identification variable setting part which sets up an identification variable which corresponds to said one sequence;

a registration control amount setting part which reads from said memory means and sets up a registration control amount which corresponds to an identification variable which is set up by said identification variable setting part; and

a correction control part which corrects transfer start positions for toner images in said respective toner colors based on said registration control amount which is set up by said registration control amount setting part.

26. An image forming apparatus in accordance with Claim 2, wherein toner images in three or more toner colors are laid over with each other to thereby form a color image, and

said control means corrects a transfer start position of a toner image in at least the second toner color based on said registration control amount.

27. An image forming apparatus in accordance with Claim 2, wherein with respect to at least two or more toner colors out of said plurality of toner colors, said control means matches the amplitude center of registration deviations in said sub scanning direction for said respective toner colors with each other during said image create/transfer processing.

28. An image forming apparatus in accordance with Claim 27, wherein with respect to all toner colors, said control means matches the amplitude center of registration deviations in said sub scanning direction for said respective toner colors with each other during said image create/transfer processing.

29. An image forming apparatus in accordance with Claim 27, wherein using one of said plurality of toner colors, in which the amplitude center of registration deviations are to be matched with each other, as a reference toner color, said control means matches the amplitude center for the other toner colors with the amplitude center for said reference toner color.

30. An image forming apparatus in accordance with Claim 29, wherein said abutting means is always away from said transfer medium while said image create/transfer processing is being executed on a toner image in said reference toner color.

31. An image forming apparatus in accordance with Claim 29, wherein a toner color in which the amplitude is the smallest among the amplitudes for said respective toner colors is said reference toner color.

32. An image forming apparatus in accordance with Claim 29, wherein four or more toner colors are prepared for creation of a color image, and a toner color in which said image create/transfer processing is executed for the third time is said reference toner color.

33. An image forming apparatus in accordance with Claim 1, comprising:

driving means which drives said photosensitive member and said

transfer medium in synchronization with each other; and

control means which causes said driving means to accelerate/decelerate said photosensitive member and said transfer medium under control to thereby shift positions at which toner images are formed on said photosensitive member in said sub scanning direction, and hence, correct transfer start positions of toner images on said transfer medium in said sub scanning direction.

34. An image forming apparatus in accordance with Claim 1, comprising:

photosensitive member driving means which drives said photosensitive member into rotation;

transfer medium driving means which drives said transfer medium; and

control means which accelerates/decelerates said transfer medium under control relative to said photosensitive member to thereby correct transfer start positions for toner images on said transfer medium in said sub scanning direction.

35. An image forming apparatus in accordance with Claim 1, comprising:

exposure means which exposes electrostatic latent images which correspond to said toner images on said photosensitive member; and

control means which controls timing to expose by said exposure

means to thereby shift positions at which toner images are formed on said photosensitive member in said sub scanning direction and accordingly correct transfer start positions of said toner images on said transfer medium in said sub scanning direction.

36. An image forming apparatus in accordance with Claim 3, wherein after forming a color image at least once or more times based on said registration control amount, said control means executes registration control amount correction to correct said registration control amount.

37. An image forming apparatus in accordance with Claim 36, wherein said registration control amount correction comprises measurement processing in which a period which is necessary for said transfer medium to rotate one round is measured a plurality of times during creation of a color image, and correction processing in which said registration control amount is corrected based on the amount of a difference between said periods.

38. An image forming apparatus in accordance with Claim 37, wherein said control means measures, as said plurality of periods, periods which correspond to primary transfer of toner images in said respective toner colors.

39. An image forming apparatus in accordance with Claim 37,

wherein said control means executes said measurement processing after said transfer medium rotates a predetermined number of times since started rotating.

40. An image forming apparatus in accordance with Claim 37, wherein said control means converts an image create instruction supplied from outside said apparatus into one or more than one jobs which are proper to operations in respective portions of said apparatus, and sequentially controls said respective portions of said apparatus in accordance with said jobs, and

said correction processing is executed during breaks between said jobs.

41. An image forming apparatus in accordance with Claim 37, wherein said control means timely executes density adjustment processing and accordingly adjusts image densities of toner images to a target density, and

said correction processing is executed concurrently with said density adjustment processing.

42. An image forming apparatus in accordance with Claim 36, further comprising memory means which stores an initial registration control amount which is identified in advance,

wherein for the purpose of creating a color image prior to

execution of said registration control amount correction, said control means reads said initial registration control amount which is stored in said memory means and accordingly corrects transfer start positions for toner images in said respective toner colors based on said initial registration control amount.

43. An image forming apparatus in accordance with Claim 36, wherein said control means executes said registration control amount establish processing to find an initial registration control amount before said registration control amount correction and before creation of a color image, and for the purpose of creating a color image prior to execution of said registration control amount correction, said control means corrects transfer start positions for toner images in said respective toner colors based on said initial registration control amount.

44. An image forming apparatus in accordance with Claim 36, wherein said control means executes said registration control amount establish processing to find said initial registration control amount, after turning on of a power source of said apparatus but before the first color image is formed.

45. An image forming apparatus in accordance with Claim 36, wherein said registration control amount establish processing is to allow said transfer medium to rotate more than one time, cause said abutting

means to contact and move away from said transfer medium which is in rotation, measure a period which is necessary for said transfer medium to rotate one round a plurality of times, and find said initial registration control amount based on the amount of a difference between said periods.

46. An image forming apparatus in accordance with Claim 36, wherein said control means determines timing to execute said registration control amount correction based on an index value which represents an operation state of said apparatus.

47. An image forming apparatus in accordance with Claim 36, wherein said registration control amount correction comprises:

measurement processing in which a period which is necessary for said transfer medium to rotate one round is measured a plurality of times during creation of a color image;

intermediate calculation processing in which an intermediate registration control amount is identified based on the amount of a difference between said periods; and

correction processing in which said initial registration control amount and said intermediate registration control amount are corrected by weighting based on an index value which represents an operation state of said apparatus as it is before execution of said registration control amount correction since establishment of said initial registration control amount, to thereby determine said registration control amount.

48. An image forming apparatus in accordance with Claim 47, wherein said index value is the number of times color images are formed.

49. An image forming apparatus in accordance with Claim 47, wherein said index value is the amount of rotation of said photosensitive member or said transfer medium.

50. An image forming apparatus in accordance with Claim 47, wherein said index value is the number of sheets on which images are formed.

51. An image forming apparatus in accordance with Claim 36, wherein said registration control amount correction comprises:

measurement processing in which a period which is necessary for said transfer medium to rotate one round is measured a plurality of times during creation of a color image;

intermediate calculation processing in which an intermediate registration control amount is identified based on the amount of a difference between said periods; and

correction processing in which said intermediate registration control amount is set as said registration control amount when an index value, which represents an operation state of said apparatus as it is before execution of said registration control amount correction since

establishment of said initial registration control amount, becomes equal to or larger than a predetermined threshold value.

52. An image forming apparatus in accordance with Claim 51, wherein said index value is the number of times color images are formed.

53. An image forming apparatus in accordance with Claim 51, wherein said index value is the amount of rotation of said photosensitive member or said transfer medium.

54. An image forming apparatus in accordance with Claim 51, wherein said index value is the number of sheets on which images are formed.

55. An image forming apparatus in accordance with Claim 36, further comprising detecting means which detects at least one of a temperature and a humidity level inside said apparatus,

wherein said control means determines timing to execute said registration control amount correction based on a result of the detection by said detecting means.

56. An image forming apparatus in accordance with Claim 1, comprising:

driving means which drives said photosensitive member and said

transfer medium into rotation in said sub scanning direction;

vertical synchronizing signal detecting means which outputs a vertical synchronizing signal in relation to rotation of said photosensitive member or said transfer medium;

exposure means which allows a light beam to scan in a main scanning direction, which is approximately perpendicular to said sub scanning direction, at scan timing which is asynchronous to said vertical synchronizing signal based on an image signal which is supplied from outside said apparatus, to thereby form an electrostatic latent image which corresponds to said image signal on said photosensitive member;

developing means which develops said electrostatic latent image to form a toner image on said photosensitive member;

transfer means which transfers said toner image on said photosensitive member onto said transfer medium;

memory means which treats said registration control amount as an acceleration/deceleration pattern of said transfer medium for correcting registration deviations which are created because of a synchronization error between said vertical synchronizing signal and said scan timing, correlates said acceleration/deceleration pattern with a synchronization error period between said vertical synchronizing signal and said scan timing, and store said synchronization error period and said acceleration/deceleration pattern in advance as correction information; and

control means which executes said image create/transfer processing in response to outputting of said vertical synchronizing signal from said

vertical synchronizing signal detecting means and controls said driving means in accordance with a synchronization error period between said vertical synchronizing signal and said scan timing, to thereby temporarily accelerate/decelerate at least said transfer medium and accordingly correct a registration deviation which is created because of said synchronization error period,

wherein said control means identifies based on said correction information an acceleration/deceleration pattern which corresponds to a synchronization error period which is actually detected and accelerates/decelerates said transfer medium under control based on said acceleration/deceleration pattern, to thereby correct a registration deviation which is created because of said synchronization error period.

57. An image forming apparatus in accordance with Claim 56, further comprising apparatus environment detecting means which detects an apparatus environment,

wherein said control means stores said correction information corresponding to each apparatus environment in advance in said memory means, and uses, as said correction information, a synchronization error period and an acceleration/deceleration pattern which correspond to an apparatus environment which is detected by said apparatus environment detecting means.

58. An image forming apparatus in accordance with Claim 56,

wherein said memory means correlates registration control amounts which are necessary to correct registration deviations which are created because of synchronization error periods, instead of synchronization error periods, with acceleration/deceleration patterns of said transfer medium, and stores said registration control amounts and said acceleration/deceleration patterns in advance as said correction information.

59. An image forming apparatus in accordance with Claim 56, wherein said driving means has a structure that at least one or more motors are used as a drive source to drive said photosensitive member and said transfer medium into rotation in said sub scanning direction in synchronization with each other, and

said control means temporarily accelerates/decelerates said transfer medium and said photosensitive member while controlling said motors in accordance with a synchronization error period, to thereby shift positions at which toner images are formed on said photosensitive member in said sub scanning direction and accordingly correct a registration deviation.

60. An image forming apparatus in accordance with Claim 56, wherein said driving means comprises a photosensitive member motor for driving said photosensitive member into rotation in said sub scanning direction and a transfer medium motor for driving said transfer medium into rotation in said sub scanning direction, and

said control means controls said transfer medium motor in

accordance with a synchronization error period, and accordingly accelerates/decelerates said transfer medium under control relative to said photosensitive member to thereby correct transfer start positions for toner images on said transfer medium in said sub scanning direction and accordingly correct a registration deviation.

61. An image forming apparatus in accordance with Claim 56, wherein acceleration/deceleration periods for accelerating/decelerating said motors are stored in said memory means as values which represent said acceleration/deceleration patterns, in correlation with synchronization error periods or registration control amounts.

62. An image forming apparatus in accordance with Claim 1, comprising:

abutting means which temporarily contacts said transfer medium while said image create/transfer processing is repeated;

driving means which drives said photosensitive member and said transfer medium into rotation in said sub scanning direction;

vertical synchronizing signal detecting means which outputs a vertical synchronizing signal in relation to rotation of said photosensitive member or said transfer medium;

exposure means which allows a light beam to scan in a main scanning direction, which is approximately perpendicular to said sub scanning direction, at scan timing which is asynchronous to said vertical

synchronizing signal based on an image signal which is supplied from outside said apparatus, to thereby form an electrostatic latent image which corresponds to said image signal on said photosensitive member;

developing means which develops said electrostatic latent image to form a toner image on said photosensitive member;

transfer means which transfers said toner image on said photosensitive member onto said transfer medium; and

control means which executes said image create/transfer processing in response to outputting of said vertical synchronizing signal from said vertical synchronizing signal detecting means, and corrects transfer start positions for toner images in said respective toner colors based on a first registration control amount, which is necessary to correct relative registration deviations among toner images on said transfer medium which are created as said abutting means contacts and moves away from said transfer medium since the outputting of said vertical synchronizing signal until the end of said image create/transfer processing which corresponds to said vertical synchronizing signal, and a second registration control amount which is necessary to correct relative registration deviations among toner images on said transfer medium which are created because of a synchronization error between said vertical synchronizing signal and said scan timing.

63. An image forming apparatus in accordance with Claim 62, further comprising memory means which stores said first registration

control amount which is obtained in advance,

wherein for the purpose of forming a toner image through execution of said image create/transfer processing in response to outputting of each vertical synchronizing signal, said control means detects a synchronization error period between said vertical synchronizing signal and said scan timing, identifies said second registration control amount which corresponds to a result of the detection, reads said first registration control amount which corresponds to said toner image from said memory means, and corrects a transfer start position of said toner image based on a total registration control amount which is the sum of the both registration control amounts.

64. An image forming apparatus in accordance with Claim 62, further comprising memory means which can store said first registration control amount,

wherein said control means executes said registration control amount establish processing before a color image is formed to thereby identify said first registration control amount and store in said memory means, and

for creation of a toner image through execution of said image create/transfer processing in response to outputting of each vertical synchronizing signal, detects a synchronization error period between said vertical synchronizing signal and said scan timing, identifies said second registration control amount which corresponds to a result of the detection,

reads said first registration control amount which corresponds to said toner image from said memory means, and corrects a transfer start position of said toner image based on a total registration control amount which is the sum of the both registration control amounts.

65. An image forming apparatus in accordance with Claim 62, wherein said control means executes said registration control amount establish processing after forming a color image at least once or more times based on said registration control amount, and corrects said first registration control amount.

66. An image forming apparatus in accordance with Claim 1, comprising:

driving means which drives said photosensitive member and said transfer medium into rotation in said sub scanning direction in synchronization with each other; and

control means which has a structure which allows to control said driving means such that said photosensitive member and said transfer medium are driven into rotation at a first and a second driving speeds which are different from each other, and for the purpose of the correction, said control means temporarily accelerates/decelerates said photosensitive member and said transfer medium from said first driving speed to said second driving speed, to thereby shift positions at which toner images are formed on said photosensitive member by said registration control amount

in said sub scanning direction and accordingly correct transfer start positions for said toner images on said transfer medium in said sub scanning direction.

67. An image forming apparatus in accordance with Claim 66, further comprising exposure means which exposes and accordingly forms electrostatic latent images, which correspond to said toner images, on said photosensitive member,

wherein said control means temporarily accelerates/decelerates said photosensitive member and said transfer medium from said first driving speed to said second driving speed during an acceleration/deceleration period in which creation of latent images by said exposure means is stopped.

68. An image forming apparatus in accordance with Claim 66, further comprising memory means which stores in advance registration control amounts and acceleration/deceleration patterns in correlation with each other,

wherein said control means, after identifying a registration control amount which corresponds to each image create/transfer processing, selects an acceleration/deceleration pattern which corresponds to said registration control amount and accelerates/decelerates under control based on said acceleration/deceleration pattern.

69. An image forming apparatus in accordance with Claim 68, wherein said memory means stores in advance registration control amounts and deceleration patterns in correlation with each other, for each apparatus environment.

70. An image forming apparatus in accordance with Claim 1, comprising:

driving means which drives said photosensitive member into rotation at a predetermined first driving speed in said sub scanning direction; and

transfer medium driving means which drives said transfer medium into rotation in said sub scanning direction; and

wherein there is control means disposed which can drive, by controlling said transfer medium driving means, said transfer medium into rotation at a first and a second driving speeds which are different from each other, and for the purpose of the correction, temporarily accelerates/decelerates said transfer medium under control from said first driving speed to said second driving speed to thereby correct transfer start positions for toner images on said transfer medium in said sub scanning direction.

71. An image forming apparatus in accordance with Claim 70, further comprising memory means which stores in advance registration control amounts and acceleration/deceleration patterns in correlation with

each other,

wherein said control means, after identifying a registration control amount which corresponds to each image create/transfer processing, selects an acceleration/deceleration pattern which corresponds to said registration control amount and accelerates/decelerates under control based on said acceleration/deceleration pattern.

72. An image forming apparatus in accordance with Claim 71, wherein said memory means stores in advance registration control amounts and deceleration patterns in correlation with each other, for each apparatus environment.

73. An image forming apparatus in accordance with Claim 1, comprising:

abutting means which temporarily contacts said transfer medium while said image create/transfer processing is repeated;

memory means which stores data; and

control means which executes said registration control amount establish processing before creating a color image to thereby identify, based on data which are acquired during said registration control amount establish processing, a registration control amount which is necessary to correct relative registration deviations among toner images on said transfer medium which are created as said abutting means contacts and moves away from said transfer medium, said control means calculating a

registration control amount based on data stored in said memory means without re-executing said registration control amount establish processing when interruption of said registration control amount establish processing is removed, to thereby correct transfer start positions for toner images in said respective toner colors in accordance with said registration control amount.

74. An image forming apparatus in accordance with Claim 73, wherein said memory means further stores a recovery control amount, and when the interruption of said registration control amount establish processing is removed, if the number of acquired data pieces at the time of the interruption is equal to or smaller than a predetermined number, said control means reads said recovery control amount as a registration control amount from said memory means without re-executing said registration control amount establish processing, and corrects transfer start positions for toner images in said respective toner colors in accordance with said registration control amount.

75. An image forming apparatus in accordance with Claim 74, wherein every time said control means executes said registration control amount establish processing and obtains a registration control amount, said control means updates said recovery control amount stored in said memory means into the newly obtained registration control amount.

76. An image forming apparatus in accordance with Claim 74, wherein a registration control amount which is obtained by executing said registration control amount establish processing at predetermined timing is stored in said memory means as said recovery control amount.

77. An image forming apparatus in accordance with Claim 74, wherein said recovery control amount is fixedly stored in said memory means.

78. An image forming apparatus in accordance with Claim 74, wherein said control means executes said registration control amount correction after forming a color image at least once or more times based on said registration control amount, and corrects said registration control amount.

79. An image forming apparatus in accordance with Claim 74, wherein said control means executes said registration control amount correction after forming a color image at least once or more times based on said registration control amount, to thereby correct said registration control amount and update said recovery control amount stored in said memory means into the newly corrected registration control amount.

80. An image forming apparatus in accordance with Claim 3, further comprising memory means which stores a recovery control amount,

wherein when the interruption of said registration control amount establish processing is removed, said control means reads said recovery control amount as a registration control amount from said memory means without re-executing said registration control amount establish processing, and corrects transfer start positions for toner images in said respective toner colors in accordance with said registration control amount.

81. An image forming apparatus in accordance with Claim 80, wherein every time said control means executes said registration control amount establish processing and obtains a registration control amount, said control means updates said recovery control amount stored in said memory means into the newly obtained registration control amount.

82. An image forming apparatus in accordance with Claim 80, wherein a registration control amount which is obtained by executing said registration control amount establish processing at predetermined timing is stored in said memory means as said recovery control amount.

83. An image forming apparatus in accordance with Claim 80, wherein said recovery control amount is fixedly stored in advance in said memory means.

84. An image forming apparatus in accordance with Claim 80, wherein said control means executes said registration control amount

correction after forming a color image at least once or more times based on said registration control amount, to thereby correct said registration control amount.

85. An image forming apparatus in accordance with Claim 80, wherein said control means executes said registration control amount correction after forming a color image at least once or more times based on said registration control amount, to thereby correct said registration control amount and update said recovery control amount stored in said memory means into the newly corrected registration control amount.

86. An image forming apparatus in accordance with Claim 2, wherein said registration control amount can be changed if necessary.

87. An image forming apparatus in accordance with Claim 86, further comprising memory means which stores registration control amounts,

wherein said registration control amounts stored in said memory means can be directly rewritten, and said registration control amounts are changed as rewritten.

88. An image forming apparatus in accordance with Claim 86, wherein said registration control amount establish processing is to allow said transfer medium to rotate more than one time, cause said abutting

means to contact and move away from said transfer medium which is in rotation, measure a period which is necessary for said transfer medium to rotate one round a plurality of times, and find said registration control amount based on the amount of a difference between said periods, and

the number of times said periods are measured can be changed, and said registration control amount is changed as the number of times said periods are measured is changed.

89. An image forming apparatus in accordance with Claim 2, wherein defined as a registration control mode is an operation mode for correcting transfer start positions for toner images based on said registration control amount, with said abutting means temporarily contacting said transfer medium while said image create/transfer processing is repeated,

defined as a registration priority mode is an operation mode which allows said abutting means to temporarily contact said transfer medium while said transfer medium idly rotates at least one or more times between first processing which is said image create/transfer processing in the last toner color and second processing which is said image create/transfer processing for the next toner image, and

said control means can select one of the two modes, and controls said abutting means to contact or move away from said transfer medium in the selected mode.

90. An image forming apparatus in accordance with Claim 89, wherein in said registration priority mode, said control means causes said transfer medium to rotate at least three or more times, allows said abutting means to temporarily contact said transfer medium after completion of said first processing, and starts said second processing after said abutting means moves away from said transfer medium.

91. An image forming method which repeats image create/transfer processing, which is serial processing of forming a toner image on a photosensitive member while rotating said photosensitive member and a transfer medium in a sub scanning direction and thereafter transferring said toner image onto said transfer medium, for a plurality of toner colors which are different from each other, to thereby lay toner images in said respective toner colors over each other on said transfer medium and accordingly form a color image, said image forming method comprising:

a first step of identifying a registration control amount which is necessary to correct relative registration deviations among toner images on said transfer medium; and

a second step of correcting transfer start positions of toner images in at least one or more toner colors out of said plurality of toner colors based on said registration control amount.

92. An image forming method in accordance with Claim 91,

wherein said first step is a registration control amount establish step of identifying a registration control amount which is necessary to correct relative registration deviations among toner images on said transfer medium which are created as abutting means temporarily contacts said transfer medium while said image create/transfer processing is repeated.

93. An image forming method in accordance with Claim 92, wherein said second step is a correction step of matching, with respect to at least two or more toner colors out of said plurality of toner colors, the amplitude center of registration deviations which are created in said sub scanning direction for said respective toner colors during said image create/transfer processing with each other.

94. An image forming method in accordance with Claim 91, further comprising a third step of storing in advance in memory means registration control amounts which are obtained at said first step,

wherein said second step is a correction step of reading from said memory means a registration control amount which corresponds to one sequence which is executed in accordance with an operation state of an apparatus among a plurality of sequences which are different from each other, and correcting transfer start positions of toner images in said respective toner colors based on said registration control amount.

95. An image forming method in accordance with Claim 91,

further comprising a fourth step of correcting said registration control amount after forming a color image at least once or more times based on said registration control amount.

96. An image forming method in accordance with Claim 91, wherein said second step is a correction step of temporarily accelerating/decelerating said transfer medium from a first driving speed to a second driving speed to thereby shift said transfer medium relative to said photosensitive member by said registration control amount in said sub scanning direction and accordingly correct transfer start positions of toner images on said transfer medium in said sub scanning direction.

97. An image forming method in accordance with Claim 91, wherein for execution of said image create/transfer processing in response to outputting of each vertical synchronizing signal, said first step comprises a first registration control amount establish step of obtaining a first registration control amount which is necessary to correct relative registration deviations among toner images on said transfer medium which are created as abutting means contacts and moves away from said transfer medium since outputting of said vertical synchronizing signal until the end of said image create/transfer processing which corresponds to said vertical synchronizing signal, and a second registration control amount establish step of obtaining a second registration control amount which is necessary to correct relative registration deviations among toner images on said

transfer medium which are created because of a synchronization error between said vertical synchronizing signal and scan timing, and

said second step is a correction step of correcting transfer start positions of toner images in said respective toner colors based on said first and said second registration control amounts.

98. An image forming method in accordance with Claim 91, wherein said second step is a correction step of temporarily accelerating/decelerating said photosensitive member and said transfer medium from a first driving speed to a second driving speed to thereby shift positions at which toner images are formed on said photosensitive member by said registration control amount in said sub scanning direction and accordingly correct transfer start positions for toner images on said transfer medium in said sub scanning direction.

99. An image forming method in accordance with Claim 92, wherein there is a fifth step of storing a recovery control amount in memory means,

there is a sixth step of, as interruption of said registration control amount establish step is removed, obtaining a registration control amount based on data which are acquired since the start of said registration control amount establish step until the interruption, without re-executing said registration control amount establish step, and

said second step is a correction step of correcting transfer start

positions for toner images in said respective toner colors based on said registration control amount which is obtained through said registration control amount establish step or at said sixth step.

100. An image forming method in accordance with Claim 92, further comprising a fifth step of storing a recovery control amount in memory means,

a seventh step of, as interruption of said registration control amount establish step is removed, reading said recovery control amount from said memory means as a registration control amount, without re-executing said registration control amount establish step,

wherein said second step is a correction step of correcting transfer start positions for toner images in said respective toner colors based on said registration control amount which is obtained through said registration control amount establish step or at said seventh step.

101. An image forming method in accordance with Claim 91, further comprising an eighth step of changing a registration control amount when necessary.

102. An image forming method in accordance with Claim 91, further comprising a ninth step of causing said abutting means to temporarily contact said transfer medium while said transfer medium idly rotates at least one or more times between first processing which is said

image create/transfer processing in the last toner color and second processing which is said image create/transfer processing for the next toner image,

wherein it is possible to select said second and said ninth steps, and said abutting means is controlled to contact or move away from said transfer medium at the selected step.